
Chapter 2



2. ALTERNATIVES INCLUDING THE PROPOSAL

2.1 INTRODUCTION

2.	ALTERNATIVES INCLUDING THE PROPOSAL.....	2-1
2.1	INTRODUCTION	2-1
2.2	POLICIES, PROCEDURES, AND IMPLEMENTATION STRATEGIES.....	2-1
2.3	SUSTAINABLE FOREST MODELING	2-2
2.4	DEVELOPMENT OF FOREST MANAGEMENT ALTERNATIVES.....	2-3
2.5	ALTERNATIVES CONSIDERED BUT ELIMINATED FROM DETAILED STUDY.....	2-5
2.5.1	The 'Un-zoned Forest' Alternative.....	2-5
2.5.2	Other Alternatives, Comments, and Suggestions	2-5
2.6	ALTERNATIVES CONSIDERED IN DETAIL	2-5
2.6.1	Features Common to all Reasonable Alternatives.....	2-6
2.6.2	Alternatives.....	2-7
2.6.3	Features that Vary Among Reasonable Alternatives	2-9
2.6.4	Projected Harvest Levels by Alternative	2-18
2.6.5	Summary of Proposed Alternatives.....	2-21
2.6.6	Summary of Environmental Consequences.....	2-21

This chapter describes and compares the six forest management Alternatives under consideration by the Board of Natural Resources to guide how a sustainable harvest level will be achieved for trust forestlands in western Washington.

Section 2.2 reviews the policy, procedure, and implementation strategies contained in the Alternatives. Section 2.3 briefly describes the computer modeling process used to analyze the Alternatives. Section 2.4 addresses the development of the six forest management Alternatives. Section 2.5 discusses Alternatives that were considered but eliminated from detailed study in the Environmental Impact Statement because they did not meet the purpose and needs of the project. Finally, Section 2.6 describes and reviews the Alternatives that are under consideration.

2.2 POLICIES, PROCEDURES, AND IMPLEMENTATION STRATEGIES

DNR serves as manager of approximately 1.4 million acres of state-owned forestlands in western Washington. Except for the Natural Area Preserves and the Natural Resource Conservation Areas, these forestlands are managed as a fiduciary trust. Over the short and long term, DNR's fiduciary responsibility is to maintain the body of the trust lands with undivided loyalty, and generate revenue from those trust lands for the designated beneficiaries. In order to meet obligations to all generations of beneficiaries, DNR must carry out land management that strikes the appropriate balance between current and future



Chapter 2

income production and the long-term preservation of trust assets. In addition to trust obligations, DNR is subject to a number of federal and state statutes that protect public resources and provide public benefits. To fulfill these mandates, there are governing policies, procedures, and strategies for management of state trust forestlands.

- The Board of Natural Resources sets the major policies designed to reflect legislated mandates, state and federal laws, and stakeholder and public interests regarding DNR-managed lands.
- DNR develops administrative procedures to effectively and efficiently implement Board-approved policies.
- DNR retains the flexibility in its field operations to respond to changing or unique circumstances. As stated in Section 1.3, the 2003 sustainable harvest calculation allows the Board and DNR to examine its policies and procedures. The State Environmental Policy Act requires DNR to examine potential environmental impacts of reasonable Alternatives consistent with the purpose and need statement. The six Alternatives were made by grouping various combinations of policy changes that represented different approaches to achieving the desired results. The State Environmental Policy Act stipulates that DNR analyze only probable adverse environmental impacts that are significant, and that such analyses be based on reasonably available information. Insignificant or beneficial impacts need not be discussed. The level of detail of the analysis is to be commensurate with the importance of the impact, with less important material summarized, consolidated or referenced (Washington Administrative Code 197-11-402).

Once Alternatives were defined, DNR used several analytical tools to evaluate each Alternative to understand the short- and long-term consequences of such an action. These include either formal or informal analyses of costs and revenue, stakeholder interests and concerns, operational feasibility, and the environmental analysis contained in this document.

2.3 SUSTAINABLE FOREST MODELING

There are several key outcomes of the sustainable forest modeling analyses. They range from an understanding of the conservation benefits to the anticipated levels of sustainable harvests of trees. A key expectation of the modeling is to determine the volume of trees that can be harvested on a continuing basis without major prolonged curtailment or cessation of harvest (formerly RCW 79.68.030, recodified at Laws of 2003, Ch. 334, sec. 128). The state-owned trust forestlands under DNR's jurisdiction are primarily valuable for the purpose of growing forests on a sustained yield basis. In determining the sustainable level of harvest, DNR incorporates statutes and proposed policies, procedures, and operations that would affect management on the state trust forestlands for decades to come.

The foundations of a sustainable forest calculation are (1) an inventory of the forest; (2) a good understanding of the various ways to manage the forest to achieve goals (policies and



procedures that form an alternative); and (3) a way to calculate outcomes of various strategies, which is done with computers and is called a model. Models organize and analyze information. The sustainable forestry model helps the public, DNR, and the Board understand the probable outcomes of Alternatives for managing the forest in various ways. The model assists in understanding the changes in forest inventory, habitat conditions, and timber harvest that result from the various Alternatives over the next 64 years, which represents the remainder of the 70-year term of the Habitat Conservation Plan. Decision-making also will rely on information generated during the State Environmental Policy Act (SEPA) analysis and public involvement processes.

Former RCW 79.68.040 (recodified at Laws of 2003, Ch. 334, sec. 555(3)) requires that “the Department shall periodically adjust the acreages designated for inclusion in the sustained yield management program and calculate a sustainable harvest level.” The model relies on the best and most complete acreage and forest inventory information available. Forest inventories are updated with current tree growth models and data from Geographic Information Systems, which have improved since the last calculation in 1996.

John Sessions, a renowned forest engineering scientist from Oregon State University, informed the Board of Natural Resources (November 2001) that there are four steps to creditability and operational success in building a forest model to derive a sustainable harvest level. DNR followed these steps in modeling the sustainable harvest Alternatives presented in this Environmental Impact Statement. The four steps are:

1. Represent organizational goals and constraints accurately in the model;
2. Use an adequate vegetation inventory;
3. Choose an appropriate land classification; and
4. Link strategic planning to implementation.

For more details on the modeling approach, refer to Appendix B. In general, DNR seeks to meet each of these steps, as it proceeds through the sustainable forestry calculation process, as well as implementing the new harvest level once it has been established.

The term “model” (as used in this document) denotes a suite or set of policy preferences expressed in modeling language and simulated by the sustainable forestry modeling software called OPTIONS. OPTIONS is a spatially explicit, land-based planning model, which has been designed specifically to address forestland management issues. OPTIONS can model “what happens, where it happens in the landscape, and show how it would change over time.” This model simulates forest growth over time, tracking where management activities happen, and gives DNR the ability to view detailed changes in the forest inventory and conditions over time and space.

2.4 DEVELOPMENT OF FOREST MANAGEMENT ALTERNATIVES

The six forest management Alternatives in this Environmental Impact Statement represent choices the Board of Natural Resources could pursue to guide management of state trust forestlands.



Chapter 2

Design of the six Alternatives was based on information collected from the public during the scoping period, discussions with the Board, and discussions with a Technical Review Committee (see Appendix B for list of members and charter). Information was also used from the preliminary models and associated results presented to the public (July 2002) and the Board (August 2002).

One objective of the Alternatives is to provide analysis and information about the results from potential policy and procedural changes. The Alternatives were designed to meet the purpose and need statement, facilitate the analyses, reflect public comment from the scoping process, and focus on Board interests.

The final set of six Alternatives reflect current management (Alternative 1), the 1997 Habitat Conservation Plan intent (Alternative 2), and four additional alternatives that meet DNR's purposes. Four key strategic questions were examined.

1. How should habitat be managed (actively or passively) to achieve the conservation benefits while providing revenue to the trusts?
2. How can revenue best be generated for the trusts (with a broad or narrow product base)?
3. How can the Board's and DNR's policies best reflect the objectives of the individual trusts?
4. How can the Board's and DNR's policies best reflect public interests?

As a result of this process, Alternatives 3 through 6 were not designed to be "ready-made" alternatives that the Board would simply pick as a Preferred Alternative. The intent is to examine a divergent set of policy expectations that demonstrate passive, active, and innovative approaches to forest management. However, the Board can choose any of the six Alternatives in their entirety if they so desire.

The Alternatives and the information from the Environmental Impact Statement, along with separate financial and social analyses and public comment, will provide key information for decision-making.

The Board can "mix and match" elements of the six Alternatives to design a Preferred Alternative for a final environmental analysis that is not one of the original six. The Board did not select a Preferred Alternative because additional information may provide a better solution than found in any of the current six Alternatives.

The process for arriving at the Preferred Alternative includes:

- Publication of this Draft Environmental Impact Statement;
- A financial analysis;
- A public comment period with public meetings and hearings;
- Two Board workshops to discuss the results, public comments, and to design a Preferred Alternative;



- Public meetings to present the Preferred Alternative and receive comments; and
- Development of the Final Environmental Impact Statement, review, and potential approval by the Board.

2.5 ALTERNATIVES CONSIDERED BUT ELIMINATED FROM DETAILED STUDY

Under the State Environmental Policy Act, a “reasonable alternative” is a feasible alternative that meets the proposal’s purpose and need statement at a low environmental cost (Washington Administrative Code 197-11-786). The following alternatives were considered but not included in the detailed analysis because they did not meet the purpose and need and were therefore not determined to be “reasonable.”

2.5.1 The ‘Un-zoned Forest’ Alternative

In the process of developing the six Alternatives (see Section 2.6), a seventh was developed, known as the “Biodiversity pathways with un-zoned management.” An un-zoned management concept is one in which there are no special areas or zones set aside exclusively for either conservation benefits or commodity production. An un-zoned forest concept combines active forest management at the landscape and forest stand level for attaining conservation benefits and revenue goals. The goal of this prospective Alternative was to examine an un-zoned management approach for all western Washington state trust forestlands following the principles of DNR’s Habitat Conservation Plan approach for the Olympic Experimental State Forest.

Upon further analysis the un-zoned forest Alternative was rejected as a reasonable alternative because it did not meet the requirements of the current Habitat Conservation Plan. Such an approach would likely require a major amendment to the plan (see Implementation Agreement, 1997 Habitat Conservation Plan). Meeting the requirements of the Habitat Conservation Plan was one of the criteria for selecting a reasonable alternative, along with meeting the Trust Mandate and Federal and State Laws.

2.5.2 Other Alternatives, Comments, and Suggestions

A very limited number of Alternatives and a large number of suggestions were received from the public. DNR examined the details and included many elements of them in the six Alternatives presented in this Environmental Impact Statement. Components not included in the current six Alternatives did not meet the purpose and needs statement (Appendix A).

2.6 ALTERNATIVES CONSIDERED IN DETAIL

Each of the Alternatives is a set of proposed policies and procedures, each of which represents a different way of achieving DNR’s legal mandates and goals. As with any extensive activities on a landscape, implementation of any of the Alternatives across western Washington could have environmental impacts. Potential impacts are evaluated in this document. In order to understand the range of possible impacts, the Alternatives are best understood in terms of their differences.



Chapter 2

DNR staff provided the Board and the public with summaries of the Alternatives as they were being developed. In this section, the reasonable Alternatives are described in two ways, in terms of the:

- Common features shared by each alternative; and
- Main policy, procedure and implementation strategy choices that meaningfully distinguish each alternative from the other.

2.6.1 Features Common to all Reasonable Alternatives

Alternative 1 (No Action) and each of the reasonable Alternatives have the following common features:

- Comply with all state and federal laws;
- Meet DNR's trust mandates (the state's fiduciary duties as a trustee); and
- Fulfill DNR's 1997 Habitat Conservation Plan.

Each of the Alternatives is consistent with the Forest Resource Plan and Departmental procedures, tasks, and guidelines, except where otherwise noted in the following Alternative descriptions.

In cases where Forest Resource Plan amendments are proposed, selection of that Alternative by the Board, or a "mix and match" Alternative including similar assumptions would result in Board-adopted amendments to the Forest Resource Plan.

The Preferred Alternative would be part of the final Environmental Impact Statement. When approved by the Board, the Preferred Alternative expressly changes current policies to align them with those included in the Environmental Impact Statement. Concurrent with the Board's approval of the Final Environmental Impact Statement, DNR's procedures and implementation strategies will be adjusted to reflect the policy choices included in the approved Final Environmental Impact Statement Alternative. In the case of some of the Alternatives, adoption of a newly approved procedure documented in the Final Environmental Impact Statement may require that DNR consult with the Federal Services as a part of ongoing Habitat Conservation Plan adaptive management efforts.

There are six westside planning units—North Puget, South Puget, Columbia, South Coast, Straits, and the Olympic Experimental State Forest (see Map 2). These planning units were developed as part of the Habitat Conservation Plan.

The environmental impact analyses in this document are summarized at the level of the planning unit, highlighting differences in likely significant impacts among the units for each Alternative.

2.6.1.1 The Olympic Experimental State Forest

The Olympic Experimental State Forest has specific management objectives and strategies in the Habitat Conservation Plan that distinguish it from the other planning units. The goal of the Olympic Experimental State Forest is to learn how to integrate timber production



and conservation across the landscape, known as an “un-zoned” approach. The Olympic Experimental State Forest is treated in each of the Alternatives as an un-zoned forest, as specified by the Habitat Conservation Plan (page IV.81).

A few procedures that affect the Olympic Experimental State Forest vary among the Alternatives. Differences include the level of harvest deferrals, such as site-specific management direction for marbled murrelets, northern spotted owls, and other resources (see Appendix B, Deferrals Among Alternatives). In addition, some aspects to the Alternatives would, when coupled with the unique management in the Olympic Experimental State Forest, result in different impacts than anticipated in the other five westside planning units. These differences are described, by resource, in the environmental effects sections of Chapter 4.

2.6.1.2 Forest Roads

Forest roads are an integral part of forest management (Habitat Conservation Plan, page IV.62-68). DNR has an important and considerable task of repairing and maintaining approximately 14,000 miles of forest roads statewide. It is expected that roads will be added and deleted to meet financial, social, and environmental objectives. Roads are best planned and analyzed for their specific environmental impacts at the operational level and are beyond the scope of this analysis. DNR road planning is through Road Maintenance and Abandonment Plans (Forest Practices Rules, 222-24-050).

At the strategic level, it is not known if, over the 64-year analysis period, an Alternative would result in more or less roads. Therefore, the model assumptions around current and future roads are common to all Alternatives.

2.6.1.3 Policies and Procedures Common to all Alternatives

A small proportion of the modeled policies, procedures, and implementation strategies vary among the reasonable Alternatives. Only those that vary among Alternatives are detailed in the following subsections. All other policies, procedures, and strategies remain constant for each Alternative. Refer to Appendix C for a discussion of select resource areas evaluated in this environmental analysis that did not vary among the Alternatives.

2.6.2 Alternatives

Alternative 1 – No Action (Current Operations)

Alternative 1 represents the Board of Natural Resources existing policies and DNR’s forest management strategies as indicated by the DNR Forest Resource Plan, 1997 Habitat Conservation Plan, Departmental procedures and tasks, current DNR operations, and all current federal and state statutes. This Alternative represents an estimate of continued management of state trust forestlands with current management strategies. In this Alternative, projecting the status quo into the future represents uncertainties, such as how DNR would manage riparian areas or marbled murrelet habitat. Therefore, in the case of



Chapter 2

riparian areas and marbled murrelet habitat, current strategies of deferral are projected indefinitely.

Alternative 2 – Habitat Conservation Plan Intent

Alternative 2 represents existing Board of Natural Resources-approved policies and forest management strategies as defined by the DNR Forest Resource Plan, 1997 Habitat Conservation Plan, and current federal and state statutes. It does not include those current Departmental procedures and tasks that were not approved by the Board. Management under this Alternative implements the Habitat Conservation Plan as originally negotiated with the Federal Services in 1997.

Alternative 3 – Combined Ownerships

Alternative 3 represents existing Board-approved policies (except Policy No. 6 on Trust Ownership Groups), forest management strategies defined in the DNR Forest Resource Plan, the 1997 Habitat Conservation Plan, and current federal and state statutes.

“Combined Ownerships” refers to a change in Forest Resource Plan Policy No. 6 defining how to group the trusts’ lands when applying the even-flow requirement in Policy No. 4.

Alternative 4 – Passive Management Approach

Alternative 4 represents managing state trust forests in western Washington with passive management approaches to provide increased conservation and habitat protection while producing revenue. This approach maintains the 1997 Habitat Conservation Plan objectives, the DNR Forest Resource Plan, and current federal and state statutes. “Passive management” refers to a land management approach that allows forest growth and structural development processes to occur with little silvicultural (cultivation of forest species and stand care) activity.

Alternative 5 – Intensive Management Approach

Alternative 5 represents managing state trust forests in western Washington with emphasis on revenue production on lands that are not dedicated to habitat conservation. It maintains 1997 Habitat Conservation Plan objectives and strategies, DNR Forest Resource Plan (with exception of proposed changes), and meets current federal and state statutes. “Intensive or active management” refers to a land management approach that accelerates forest growth and structural development processes through greater use of silvicultural activities.

Alternative 6 – Innovative Silvicultural Management

Alternative 6 represents managing state trust forests in western Washington using “innovative silvicultural management” techniques to generate both increased conservation benefits and revenue for the trusts. This approach attempts to integrate habitat and revenue generation objectives while maintaining the current Habitat Conservation Plan approach, DNR Forest Resource Plan objectives, and meeting current federal and state statutes. Alternative 6 is based on increased silvicultural activity designed to accelerate forest growth and structural development processes.



2.6.3 Features that Vary Among Reasonable Alternatives

The six Alternatives feature changes to policies, procedures, and implementation strategies, which are summarized below.

2.6.3.1 Ownership Groups

Currently, the sustainable forestry calculation is based on “ownership groups.” Ownership groups include the Forest Board Transfer lands (calculated by individual counties (17 total in western Washington), Federal Grant lands and Forest Board Purchase (calculated by DNR administrative regions, of which there are 5 in western Washington), Capitol State Forest, and Olympic Experimental State Forest (see Map 3). Current policy on ownership groups is defined in the DNR Forest Resource Plan under Policy No. 6 (western Washington Ownership Groups). In all, there are 24 ownership groups. This current organization is retained in Alternatives 1 (No Action), 2, and 4.

Two variations of current policy are proposed in Alternatives 3, 5 and 6. In Alternative 3, all westside trust forestlands are placed into one ownership group. In Alternatives 5 and 6 the Federal Grant lands and Forest Board Purchase lands (currently five ownership groups) are placed into one ownership group. This reduces the overall number of groups from the current 24 to 20. The change to ownership groups proposed in Alternatives 3, 5, and 6 would require a change to Forest Resource Plan Policy No. 6.

2.6.3.2 Timber Harvest Levels

The method of calculating the sustainable forestry levels is central to the management of state trust forestlands. Sustainable harvest can be regulated by several means, including volume, acreage, and economic value. Current Board of Natural Resources policy uses timber volume.

When harvest is calculated by volume, as current policy dictates (Forest Resource Plan Policy No. 5), the objective is to determine the maximum harvest volume that can be sustained over a planning period, subject to a large number of legal and policy constraints. Timber volume is expressed in terms of millions of board feet of timber.

If economic value is used to replace volume, the objective is to focus on timber value. This is a significant difference. DNR would harvest more or less volume in response to changing market prices.

Alternatives 1 through 4 incorporate current policy, regulating harvest by volume. Alternatives 5 and 6 regulate harvest by economic value, requiring a change to Forest Resource Plan Policy No. 5.

2.6.3.3 Sustainable Even-flow Timber Harvest

Timber harvest “even-flow” ensures that about the same amount of timber is available now and for future generations in perpetuity. Basically, “sustained yield” means that harvest (yield) does not exceed productivity (growth). It is a method for reaching forest equilibrium over time. However, changes in forest practice regulation, management



Chapter 2

objectives, land classifications (zoning), listing of threatened and endangered species, variable market conditions, and other factors can disrupt the equilibrium. This necessitates periodic adjustments in the calculation. The current policy for sustainable even-flow timber harvest is defined in Forest Resource Plan Policy No. 4. The policy states, “The Department will manage state [trust] forest lands to produce a sustainable, even flow harvest of timber, subject to economic, environmental and regulatory considerations.” In application, the term “even flow” means that roughly the same amount of timber is offered for sale by DNR on an ongoing basis. It refers to the amount of variability from the sustainable forestry level that will be entered into the computer model. Different interpretations of sustainable even-flow would result in different harvest levels.

The definition for sustained yield contained in the Revised Code of Washington (formerly RCW 79.68.030, recodified at Laws of 2003, Ch. 334, sec. 555(3)) requires “management of the forest to provide harvesting on a continuing basis without major prolonged curtailment or cessation of harvest.” This concept of sustained or sustainable even-flow can be characterized in several ways. Alternative 1 (No Action) and the five other Alternatives explore different approaches to what is an “appropriate” level of variability by approaching even flow in different ways.

Alternative 1 and Alternative 4 propose no change to the current implementation of Forest Resource Plan Policy No. 4. As such, even-flow is managed as a narrow band of variation, allowing the harvest level to vary by as much as 25 percent above and below the long-term harvest level.

Alternative 2 proposes a “relative” non-declining even-flow approach (this is similar to how the 1996 DNR sustainable harvest calculation examined allowable cut levels by ownership group).

Alternative 3 expands the allowable variation in harvest level, controlling harvest fluctuation level as a wider band with no cessation or prolonged curtailment of harvest (formerly per RCW 79.68.030, recodified at Laws of 2003, Ch. 334, sec. 555(3)).

Alternatives 5 and 6 propose to implement the sustainable even-flow policy by revenue rather than harvest volume. The policy objective is to have timber harvest flows not vary from a previous decade more than ± 25 percent. This approach uses the flow constraint approach from the University of Washington model (Bare et al. 1997).

None of the Alternatives would require a change to Forest Resource Plan Policy No. 4 even-flow. However, Alternatives 2, 3, 5, and 6 would require a change to the “discussion” section of that policy. If the Board selected a Preferred Alternative that calculates harvest level by value—instead of volume—then Forest Resource Plan Policy No. 5, to control harvest by volume, would need to be amended accordingly.

Alternatives 2 to 6 would require revisions to DNR Procedure 14-001-010 (Determining Harvest Levels and Completing the Five-Year Action and Development Plan) and Forestry



Handbook Task 14-001-020 (Developing the Draft Five-Year Action and Development Plan).

2.6.3.4 Maturity Criteria and Rotation Age: Determining the Minimum Regeneration Harvest Age

Maturity criteria determine the earliest age that a stand is considered eligible for regeneration harvest and are applied in even-aged forests. Forest Resource Plan Policy No. 11 describes how DNR determines maturity criteria. Currently, these criteria are determined by balancing the biological productivity and the economic potential of a stand of trees.

The purpose of stand age has become outdated as a management tool for determining suitability for regeneration harvest. Forest structure-based criteria and market-based objectives provide better criteria for implementing silvicultural strategies. In addition, estimating stand age is difficult and expensive. Estimating stand age will become more difficult as DNR manages more areas containing groups of trees with different ages.

The determination of maturity criteria should not be confused with “rotation.” Rotation refers to the time interval between ‘when a new stand is established’ and ‘final harvest’ in even-aged management systems (Helms 1988). A rotation is determined by the silvicultural objectives for the forest stand. For a forest land base consisting of many mixed species stands of trees and with different growing potentials or site classes, an average rotation age generally represents the age at which forest stands are likely to be harvested. The average rotation across forest landscapes managed by DNR is the result of an array of policy goals and forest characteristics.

In western Washington, DNR’s current average rotation age is 60 years (Forest Resource Plan Policy No. 4). To meet specific objectives such as stand diversity, the Department may cut some stands as early as 45 years and other stands only when trees reach 100 years (Forest Resource Plan Policy No. 4).

In Alternatives 1, 2, and 3, maturity criteria are determined in accordance with the existing Forest Resource Plan Policy No. 11, through a balancing of tree growth potential and economic potential. Under this policy direction, neither maximum net present value nor culmination of growth determines when a stand of trees should be harvested. Instead, the decision is based on a balance of these two criteria. As an example, a Douglas-fir stand on site class III ground (average quality) has a minimum regeneration harvest age of 60 years.

In Alternative 4, maturity criteria are determined with an emphasis on tree growth over economic potential. In other words, the emphasis is to harvest a stand of trees as it approaches its culmination of growth (the end of the period of rapid growth). As an example, in Alternative 4, a Douglas-fir stand on site class III ground has a minimum regeneration harvest age of 80 years.

In Alternative 5, maturity criteria are determined with an emphasis on economic potential over tree growth potential. In this Alternative, the emphasis is on harvesting stands of trees



Chapter 2

when they have reached their maximum economic value, expressed as maximum net present value. As an example, in Alternative 5, a Douglas-fir stand on site class III ground has a minimum regeneration harvest age of 50 years. Alternatives 4 and 5, therefore, propose a change to current Forest Resource Plan Policy No. 11.

In Alternative 6, the maturity criteria are determined with an emphasis on economic potential over tree growth potential, as in Alternative 5. However, in Alternative 6, the implementation of biodiversity pathways silviculture presented by Carey et al. (1996) leads to an outcome of alternating harvest ages. For example, a Douglas-fir stand on site class III ground in a habitat resource area (i.e., riparian areas, northern spotted owl habitat areas, or spotted owl dispersal areas) may have harvest ages that alternate between 60 and 130 years. This feature, in theory, allows for simultaneous increases in production of both habitat and income. This feature, in addition to the implementation of innovative silvicultural techniques such as repeated entry thinnings that create habitat structures like down logs, snags, and multi-level forest canopies, would require changes to Forest Resource Plan Policy Nos. 30 and 31.

The determination of maturity criteria for each Alternative would require changes to Forest Resource Plan Policy No. 11, the discussion in Forest Resource Plan Policy No. 4, and to DNR Procedure 14-005-020 (Identifying and Prioritizing Stands for Regeneration Harvest).

2.6.3.5 Northern Spotted Owl Habitat Management

None of the Alternatives proposes changes to the nesting, roosting, foraging and dispersal habitat strategies outlined in the Habitat Conservation Plan (page IV.3).

Northern spotted owl management is represented by a suite of policy, procedural, and implementation strategies. These are currently specified in the Habitat Conservation Plan and Procedure 14-004-120.

Northern spotted owl habitat circle management is currently applied to three types of owl circles listed in Procedure 14-004-120. As specified in the Implementation Agreement Memorandum 1 of the Habitat Conservation Plan, no timber harvest is allowed within certain spotted owl circles prior to 2007, and harvest is allowed only within non-habitat areas of several other circles. These areas are identified as “Memorandum 1” (Memo 1) owl circles.

Two other groups of owl circles—“Status 1 – Reproductive” (Stat. 1-R) and “Southwest Washington” (SW Washington)—receive explicit consideration in Procedure 14-004-120. Timber harvest activities are allowed only in the non-habitat portions of four SW Washington owl circles, and only habitat enhancement activities are allowed in the non-habitat portion of all Stat 1-R owl circles throughout the planning area. The Washington Department of Fish and Wildlife defined both Status 1 Reproductive and SW Washington owl circles.

Chapter 2



Alternatives 2 to 6 propose changes to current operations from those defined in Alternative 1 (No Action). Management of Memo 1 owl circles remains the same for all Alternatives (1 to 6) (deferred until 2007).

Management of Stat. 1-R and SW Washington circles outside the Olympic Experimental State Forest varies among the Alternatives. Alternatives 3 to 6 propose to defer these owl circles from harvest until 2007, while Alternative 2 proposes no deferral of these circles. In all Alternatives, except Alternative 1, deferral of timber harvests in Stat. 1-R owl circles in the Olympic Experimental State Forest would cease in 2004. Adoption of one of Alternatives 2 through 6 would each require a change in Procedure 14-004-120 but no amendment to the Habitat Conservation Plan would be required.

Under current procedure, when the area designated for nesting, roosting, foraging or dispersal management within a Watershed Administrative Unit (based on 2000 Watershed Administrative Unit delineations and referred to in this document as “watershed”) is below 50 percent of the desired habitat, regeneration harvests are not allowed. Regeneration harvests are allowed when the threshold is reached or exceeded (Habitat Conservation Plan, page IV.4). If less than 50 percent of designated nesting, roosting, and foraging or dispersal management areas in a watershed meets the habitat requirements, then only habitat enhancement activities may be conducted, even in the non-habitat portion of that watershed. Habitat enhancement includes thinnings that accelerate tree growth and encourage understory development. The optimum time to thin trees depends on the size and number of trees in a given area. This can be expressed as a stand’s average relative density (Curtis 1982). The goal is to maintain a stand above a relative density of 45 and below 70. At a relative density of about 70 and above, forests are closed, with trees competing for growing space, light, and nutrients and some trees are suppressed and die. At a relative density of less than 45, forests become more open, with greater distances between trees where light and water can directly hit the forest floor. The result is a reallocation of energy from trees to the forest floor and understory. Low-impact access development and maintenance (including stream crossings and yarding corridors) is allowed in watersheds below the 50 percent habitat requirement.

This current management is modeled only in Alternative 1 (No Action), and would require no change to procedure.

In Alternative 1, nesting, roosting, foraging and dispersal management strategies are implemented as constraints, whereby if conditions are not met, management is restricted. However, habitat strategies can be implemented as targets, as originally articulated in the Habitat Conservation Plan (page IV.1-38).

In Alternative 2, a target of 50 percent desirable habitat is established for designated nesting, roosting, and foraging, or dispersal management areas within a watershed. However, unlike Alternative 1 (and Procedure 14-004-120), thinning is available as a strategy to create and maintain nesting, roosting, and foraging management area objectives. In addition, regeneration harvests and thinnings are allowed in non-habitat areas in the rest of the watershed even if the watershed currently has less than 50 percent habitat. This



Chapter 2

approach is used in Alternatives 2, 3, and 4 and would require a change to Procedure 14-004-120 (Management Activities Within Spotted Owl Nest Patches, Circles, Designated Nesting, Roosting, Foraging, and Dispersal Management Areas).

Alternatives 5 and 6 propose a variation on the strategy proposed in Alternatives 2 through 4. Northern spotted owl conservation management in Alternative 5 is similar to that in Alternatives 2 to 4, with additional heavier thinnings to accelerate the development of large-diameter trees within stands to create and maintain sub-mature nesting, roosting, foraging, and dispersal habitat. Alternative 6 takes this strategy one step further based on concepts of biodiversity pathways described by Carey et al. (1996). These types of thinnings would be applied in small-diameter dense stands where stand viability would not be compromised. In these stands, the average relative density can be lowered to 35. In larger diameter stands, stand densities are maintained between 45 and 70. Thinning large-diameter closed stands too heavily and opening up the canopy too much may lead to blow-down and destroy much of the existing forest structure (e.g., snags). In all cases, the silvicultural prescriptions would include treatments to create and maintain snags, coarse woody debris, and small openings, as well as areas of heavy thinnings, light thinnings, and unthinned areas. As in Alternatives 2, 3, and 4, implementation of Alternatives 5 and 6 would require a change to Procedure 14-004-120.

2.6.3.6 Old Forest Components

“Old forests,” their definition, components, extent, and management are important issues in sustainable forestry management. Old forests are defined as a forest inventory unit with old growth structure. DNR currently manages old forests with four basic guidelines in addition to the spotted owl requirements discussed previously.

1. The Old Growth Research Area deferrals (Forest Resource Plan Policy No. 14) will be deferred from harvest. The purpose of these deferrals is to maintain DNR’s ability to do research and collect data that may assist management elsewhere and benefit the trusts in the long run.
2. Olympic Experimental State Forest conservation strategies in the Habitat Conservation Plan specify that 20 percent of DNR-managed state forests in any given Olympic Experimental State Forest landscape will be maintained in older forest conditions (Habitat Conservation Plan, page IV.88).
3. Where DNR manages at least 5 percent of the total watershed, DNR will maintain at least 50 percent of its forested land in trees 25 years old or older (Task 14-001-010, Maintain Mature Forest Components). This so-called “50/25” strategy stipulates that until 50 percent of a watershed meets the forest maturity criterion, no regeneration harvest is allowed in that watershed.
4. Legacy and reserve trees will be retained in regeneration harvest units as detailed in Procedure 14-006-090 [Legacy and Reserve Tree Levels for Regeneration Harvest Units (Variable Retention Harvesting)].

Chapter 2



Alternative 1 includes all provisions for old forest management in current operations, as defined above, requiring no changes to policy or procedure.

Alternatives 2 to 6 maintain two of the four basic components of current management—Old Growth Research Area deferrals as defined in Forest Resource Plan Policy No. 14, and the management for old forest conditions in the Olympic Experimental State Forest as defined in the Habitat Conservation Plan (page IV.88).

Alternatives 2 to 6 do not maintain the “50/25” strategy and would require changes to Task 14-001-010 if one of these Alternatives is adopted by the Board. In addition, Alternatives 2 to 6 replace the required legacy and reserve tree level requirements in Procedure 14-006-090 with language implementing the protection of structurally unique trees and snags described in the Habitat Conservation Plan (pages IV.156-157). Under Alternatives 2 to 6, this legacy and reserve tree procedure would change from the current procedure requiring retention of 7 percent of the trees in regeneration harvest units to the Habitat Conservation Plan strategy of retaining a minimum of 8 trees per acre.

Alternatives 4, 5, and 6 have different approaches to maintaining and/or creating old forest conditions.

Alternative 4 proposes to defer for the entire planning period all standing old forests with an age equal to or greater than 150 years in the 2001 forest inventory. This is an age-based criteria without structural considerations found in the Habitat Conservation Plan definition of old forests.

Rather than specifically preserving all forests of a certain age existing today, Alternatives 5 and 6 propose that 10 to 15 percent of each westside HCP Planning Unit be targeted as old forests based on structural characteristics.

Adoption of these features by the Board would require changing Forest Resource Plan Policy Nos. 3 and 14.

2.6.3.7 Riparian and Wetland Areas

The riparian management zone strategies in the Alternatives are based on the riparian management activities described in the Habitat Conservation Plan (pages IV.59-62). Frequency and intensity of management within these zones varies among the Alternatives.

None of the Alternatives proposes changes to the plan’s riparian management zone designations or basic guidelines for management within those zones under the Habitat Conservation Plan. No changes are proposed for wetland management zones in any of the Alternatives. To aid in understanding DNR’s Habitat Conservation Plan management of riparian and wetland areas, some of the history of planning and implementation is provided below.

The Habitat Conservation Plan specified an interim set of management procedures to be used until permanent procedures could be developed by DNR, then reviewed and approved by the Federal Services (Habitat Conservation Plan page IV.61). Once implementation



Chapter 2

began according to the plan, DNR agreed not to conduct activities in riparian management zones—other than limited road development and maintenance—until a permanent procedure had been agreed upon. Current management of these sensitive areas follows the plan's guidelines and are identified in Procedure 14-004-150 (Identifying and Protecting Riparian and Wetland Management Zones in westside Habitat Conservation Plan Planning units, Excluding the Olympic Experimental State Forest Planning Unit). As stated in the plan, riparian management zones are to be developed on stream types 1, 2, 3, and 4, and wetland management zones are to be developed for wetlands greater in size than 0.25 acre.

Currently, no harvest activities are conducted within designated riparian management zones, except road and yarding corridor crossings. Activities are allowed within the wetland management zones as identified in Procedure 14-004-110. These guidelines would not change under Alternatives 1 and 4, requiring no change to DNR policy or procedure.

Newly proposed riparian procedures are under negotiation with the Federal Services (at time of publication). Alternatives 2, 3, 4, 5, and 6 are consistent with the draft riparian procedures.

Alternatives 2, 3, 5, and 6 provide a range of restoration and silvicultural activities that may be allowed under the final riparian procedure. Ecosystem restoration encompasses a range of activities that must be site-specific and tailored to the physical and biological conditions at a particular site.

As defined in the Habitat Conservation Plan (page IV.62), disturbance of areas of potential slope instability within riparian areas and wetlands is minimized to light access development and maintenance (road and yarding corridors).

In Alternatives 2 and 3, restoration and silvicultural activities are allowed at a low intensity within the riparian zones. Light variable thinnings are the principal silvicultural and restoration method to maintain stands for longer rotations and to increase structural complexity. It was assumed for modeling purposes that activities in Alternatives 2 and 3 would maintain canopy closure (relative density of 45 or greater) over 90 percent of the riparian management area.

In Alternatives 5 and 6, restoration and silvicultural activities are allowed at moderate intensity within the riparian zones. Alternative 5 allows heavier commercial thinnings (see Appendix B for a description of thinning types) to accelerate future large-diameter, structurally complex stands. For modeling purposes, it was assumed that activities in Alternative 5 would maintain canopy closure (relative density of 45 or greater) over 70 percent of the riparian management area.

Alternative 6 proposes a different approach from those in Alternatives 1 through 5. As in Alternative 5, Alternative 6 allows heavier thinnings in the riparian zones. Unlike the other Alternatives, biodiversity pathways management (Carey et al. 1996) is used to achieve desired structural components of a complex riparian forest stand. In these types of thinnings, relative density can be lowered to 35 in small-diameter dense stands. In larger



diameter tall stands, relative densities are maintained between 45 and 70. Thinning large-diameter closed stands too heavily and opening up the canopy too much, may lead to blow-down and destroy much of the existing forest structure (i.e., snags and down logs). In all cases, the silvicultural prescriptions would include snag and coarse woody debris treatments, the creation of small openings, areas of heavy thinnings, light thinnings and leave areas. For modeling purposes, it was assumed that activities in Alternative 6, as in Alternative 5, would maintain canopy closure (relative density of 35 or greater) over 70 percent of the riparian management area.

The Habitat Conservation Plan management strategies for the Olympic Experimental State Forest are designed to effectively maintain key physical and biological functions until streams recover sufficiently from past disturbances. Recovery allows greater integration of commodity production and conservation. Combined with the current forest conditions and experimental objectives, the Olympic Experimental State Forest riparian strategies are different from the westside HCP Planning Units (page IV.132). For the purposes of modeling, canopy closure is maintained (relative density of 33 or greater) over 67 percent of the riparian management area in the Olympic Experimental State Forest under all Alternatives.

2.6.3.8 Linking Plans to Implementation

The 1997 Habitat Conservation Plan is consistent with the DNR Forest Resource Plan. The Habitat Conservation Plan contains updated information and policy direction; the Forest Resource Plan envisioned such updates. The Habitat Conservation Plan sets management objectives at the landscape level and provides guidance for near and long-term management. It sets wildlife management objectives for the 1.6 million acres covered by the Habitat Conservation Plan, including all the acreage subject to this sustainable forestry calculation. The five western Washington HCP Planning Units are the Habitat Conservation Plan's fundamental building blocks, which set performance standards and reporting functions at the level of these units.

To meet contractual responsibilities and Board policies, operational implementation strategies would be based on a hierarchical planning approach, as previously presented to the Board in August 2001 (see Figure 2.6-1). When the Board selects and ultimately adopts a Preferred Alternative and associated sustainable forestry level, DNR would develop operational implementation plans for the adopted Alternative.



Chapter 2

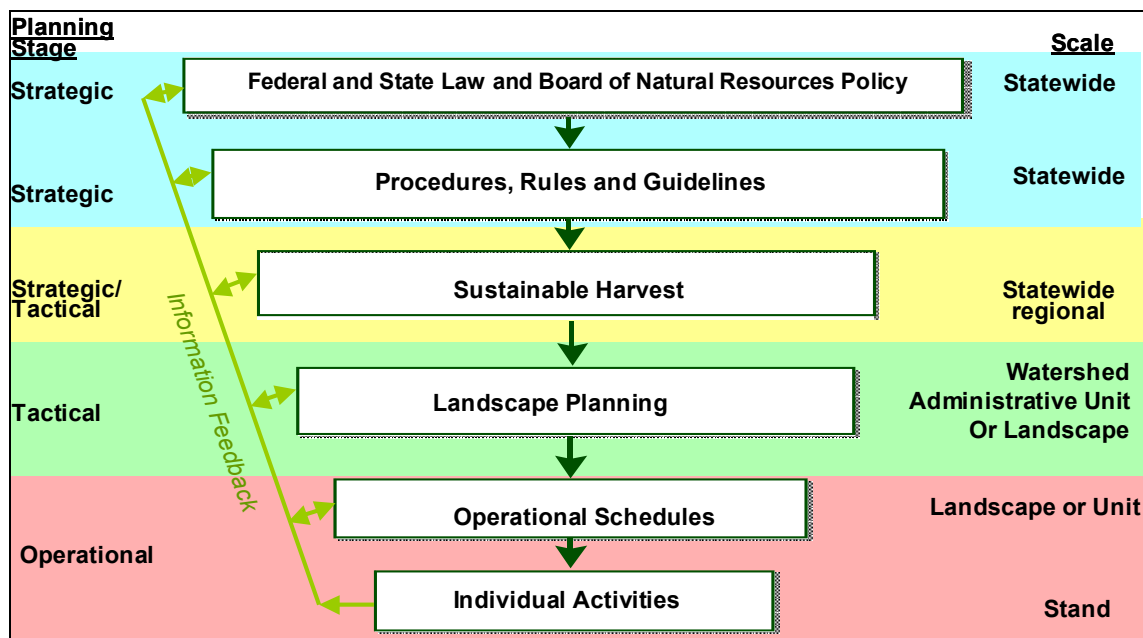


Figure 2.6-1. Hierarchical Planning Model

2.6.4 Projected Harvest Levels by Alternative

Each Alternative has two major components. The first is the set of policy and procedural changes (Table 2.6-1) necessary to accomplish the goals of that Alternative, and the second are the decadal sustainable harvest levels by ownership groups trusts (Tables 2.6-2 and 2.6-3).

The modeling outputs for an Alternative provide substantial information to help understand the management impacts and harvest levels associated with each Alternative. The modeling outputs are based on reasonably available information, and are used in the Environmental Impact Statement to inform decision-makers and the public of possible significant impacts on various resources. These outputs do not form the basis of the analyses in this document, however. Instead, the environmental analysis is based on a review of proposed changes to policy and procedures under which DNR operates. This is because DNR's actions under all Alternatives would be governed by policies and procedures, and would not simply follow the management pathways shown by modeling outputs. The analysis, therefore, takes into consideration the complete suite of policies, strategic plans, and procedures that direct and guide DNR's forest management activities on state forestlands in western Washington. DNR considers the model outputs as the best information available to illustrate the range of likely outcomes for each of the Alternatives at the watershed scale. In Section 4.15, Cumulative Effects, modeling outputs and additional data are used to help describe the relative potential impacts, also at the watershed scale. Watersheds used in this analysis represent the March 2002 Watershed Administrative Unit coverage.

Chapter 2



Table 2.6-1. Summary of Policy, Procedure, and Task Changes under the Six Alternatives

Management Issue	Policy, Procedure, Task Reference	Forest Management Alternatives					
		1	2	3	4	5	6
Ownership groups	Policy No. 6	Current policy (24 groups)	Current policy (24 groups)	Change policy (1 group)	Current policy (24 groups)	Change policy (20 groups)	Change policy (20 groups)
Even-flow of harvest	Policy No. 4 PR 14-001-010 TK 14-001-020	Current policy	Update policy discussion	Update policy discussion	Current policy	Update policy discussion	Update policy discussion
			Change procedure, task	Change procedure, task	Change procedure, task	Change procedure, task	Change procedure, task
Harvest regulation	Policy No. 5	Current policy	Current policy	Current policy	Current policy	Change policy	Change policy
Maturity criteria	Policies No. 4, 11, 30, 31 PR 14-005-020	Current policy and procedure	Update policy discussion (No. 4)	Update policy discussion (No. 4)	Update policy discussion (Nos. 4, 11)	Update policy discussion (Nos. 4, 11)	Update policy discussion (Nos. 4, 11, 30,31)
			Change procedure	Change procedure	Change procedure	Change procedure	Change procedure
Northern spotted owl conservation	Nesting, roosting, foraging and dispersal PR 14-004-120	Current procedure	Change procedure	Change procedure	Change procedure	Change procedure	Change procedure
	Owl circles PR 14-004-120	Current procedure	Change procedure	Change procedure	Change procedure	Change procedure	Change procedure
Old forest components	Policy No. 14 (Old Growth Research Areas)	Current policy	Current policy	Current policy	Update policy discussion	Change/new policy	Change/new policy
					New procedure/task	New procedure/task	New procedure/task
	Task 14-001-010 (Maintaining Mature Forest Components)	Current task	Change Task	Change Task	Change Task	Change Task	Change Task
	PR 14-006-090 (Legacy and Leave Tree Levels)	Current procedure	Change procedure	Change procedure	Change procedure	Change procedure	Change procedure
Riparian and wetland areas	PR1 14-004-150	Current procedure	Change procedure (Requires Services' agreement)	Change procedure (Requires Services' agreement)	Current procedure	Change procedure (Requires Services' agreement)	Change/new procedure (Requires Services' agreement)



Chapter 2

Table 2.6-2. Summary of State Trust Lands Sustainable Harvest Level in Million Board Feet per Year by Ownership Group for First Decade (2004-2013) Under Each Alternative

		Sustainable Forest Management Alternatives					
		1	2	3	4	5	6
Trust Group	Ownership Group	First Decade Values in Millions of Board Feet per Year					
Federal Granted Trusts	DNR Central Region	38	58		61		
	DNR Northwest Region	48	60		52		
	DNR Olympic Region	7	17		13		
	DNR South Puget South Region	44	36		26		
	DNR Southwest Region	56	67		59		
	Federal Grants as one Westside group					335	386
	Capitol State Forest	38	43		37	44	65
	Olympic Experimental State Forest	19	62		8	170	39
Forest Board Transfer Trust	Clallam County	6	15		15	27	32
	Clark County	11	13		9	16	20
	Cowlitz County	4	6		4	8	8
	Jefferson County	5	6		3	8	9
	King County	10	8		6	14	13
	Kitsap County	3	3		3	3	4
	Lewis County	14	21		17	21	28
	Mason County	9	10		8	12	14
	Pacific County	3	6		6	13	14
	Pierce County	4	4		1	4	1
	Skagit County	32	36		34	50	53
	Skamania County	5	15		3	16	6
	Snohomish County	24	29		28	40	48
	Thurston County	2	6		2	5	6
	Wahkiakum County	4	5		6	11	11
	Whatcom County	10	12		10	22	24
	All trusts as one Westside group			663			
	Westside harvest level	396	537	663	411	819	781

Note: Total harvest values in this table do not match all values in Table 2.6-3 due to rounding.

Chapter 2

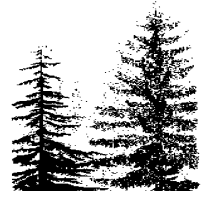


Table 2.6-3. Summary of Projected Harvest Levels in Millions of Board Feet Per Year for First Decade (2004-2013) by State Trust, by Alternative

Trusts	Sustainable Forest Management Alternatives					
	1	2	3	4	5	6
	First Decade Values in Millions of Board Feet per Year					
Agricultural School	9	9	7	12	12	13
Capitol Grant	34	37	46	29	74	59
Charitable/Educational/Penal and Reformatory Institution	15	15	17	12	20	26
Community College Forest Reserve	2	1	0	1	1	1
Common School and Indemnity	114	174	179	121	267	259
Escheat	2	2	2	1	2	2
State Forest Board Purchase	32	39	61	35	48	59
State Forest Board Transfer	157	212	300	163	324	307
Normal School	6	12	11	7	14	14
Scientific School	23	22	29	25	33	32
University - Original	1	0	1	1	1	1
University - Transferred	1	13	9	4	21	8
Grand Total	396	536	662	411	817	781

Note: Total harvest values in this table do not match all values in Table 2.6-2 due to rounding.

2.6.5 Summary of Proposed Alternatives

As detailed in Section 2.6.2, there are several policy, procedure, and implementation strategy changes for each of the Alternatives (except Alternative 1). Table 2.6-1 summarizes changes that would be necessary if the Board eventually selects an Alternative or a feature of an Alternative. If selected, such changes would become effective following the release of the Final Environmental Impact Statement and closure of the statutory waiting period.

2.6.6 Summary of Environmental Consequences

This section summarizes the environmental analysis detailed in Chapter 4, which examines the effects of proposed changes to the current policy and procedures, under each Alternative. The analysis uses modeling outputs to inform the public and decision-makers of the relative differences in potential environmental impacts. This analysis also allows DNR to assess relative risks that are identified using modeling outputs.

In Chapter 4 and the summary below, two aspects of the environmental analysis are identified and discussed—the probable significant adverse impacts and potential risks. Probable significant adverse impacts are identified and defined in Washington Administrative Codes 197-11-782 and 197-11-794.



Chapter 2

Potential relative risks are identified and discussed for the resource areas and are used to rank the Alternatives. The potential relative risks and rankings express the potential for a negative environmental impact to occur and/or indicate if an Alternative may fail to meet all of its projected outcomes.

None of the Alternatives would result in any probable significant adverse impacts to any of the resource areas. A relatively high risk does not necessarily equate to a probable significant adverse impact when compared to another Alternative or to existing conditions.

Forest Structure

Alternatives 1 and 4 would provide more old forest and would entail less risk of adversely affecting threatened, endangered, and sensitive plants than the other Alternatives. However, Alternatives 1 and 4 would result in more dense forest stands that achieve lower tree growth rates and are more susceptible to damage from insects and disease. They rely on more passive management and would require less investment for forest management. Alternatives 2 and 3 are ranked intermediate on all factors and would also require an intermediate level of investment needed for successfully implementing the management strategies associated with these Alternatives and achieving the projected level of harvest.

Alternatives 5 and 6 would have fewer restrictions on areas available for stand management and timber harvest and would apply more intensive management strategies than the other Alternatives. Management proposed under Alternatives 5 and 6 would result in higher rates of tree growth, forests that are less susceptible to insect and disease damage, and higher levels of long-term carbon storage. Alternative 6 also ranks relatively high for maintaining stands with old forest characteristics. Alternatives 5 and 6 would entail more risk of adversely affecting threatened, endangered, and sensitive plants due to more harvest and harvest-related disturbance.

Indirect impacts on other resources, such as riparian resources, fish, and wildlife, are the result of different forest management strategies. These differing forest management strategies change the harvest intensity and harvest type. These impacts are summarized in each of the resource discussions below.

Riparian

The proposed different management strategies in riparian areas do not result in any “probable significant adverse impacts” in terms of development of future forest structures in the riparian zone relative to existing conditions and beyond those anticipated in the Habitat Conservation Plan environmental analysis. However, the level of management activity, such as silvicultural activities, in the different Alternatives could result in variable impacts. Such impacts, both beneficial and negative, vary when analyzed in the short term versus the long term. Alternative 6 is projected to develop more “functional” forest area in riparian areas; however, these projections are the outcome of an active management program of thinnings, snags, and down woody debris treatments.

Chapter 2



Each of the Alternatives proposes different amounts of harvest activities in the riparian land class (Appendix D). The estimated average activity level of Alternative 5 is 13 percent per decade; Alternative 3 is 8 percent per decade; Alternative 2 is 7 percent per decade; Alternative 4 is 5 percent per decade; and Alternative 1 is 3 percent per decade.

The average estimated level of activity under Alternative 6, 35 percent per decade, represent substantially higher levels than the other Alternatives, although the majority of the harvest area in Alternative 6 is low volume removal harvests. Alternative 6 model results show a high level of activity within the riparian areas. It appears likely that the modeling outputs for Alternative 6 over-estimates the amount of allowable activity in the riparian areas. Upon examination, the problem is not with the fundamental policy direction in Alternative 6, but rather the outcome of initial modeling assumptions. Additional modeling will be completed for the Final Environmental Impact Statement.

Wildlife

Alternatives are consistent with the Habitat Conservation Plan. Environmental effects anticipated under all Alternatives would be within the level of impacts anticipated to wildlife species and analyzed in the Habitat Conservation Plan Environmental Impact Statement (DNR 1996). Changes under some alternatives in procedures that address the management of northern spotted owl habitat would be consistent with the goals and objectives of the Habitat Conservation Plan.

Other policy and procedure changes under the Alternatives would influence the amount and distribution of wildlife habitat on DNR westside trust lands. The Alternatives would vary in the timing and amount of forest structures they would create, but would not be expected to have any significant adverse environmental effects on wildlife. In the short term and long term, the amount of structurally complex forest is modeled as increasing in all planning units under all Alternatives. Structurally complex forest cannot, however, be used as a measure of DNR's success in meeting its obligations under the Habitat Conservation Plan. Instead, structurally complex forests serve as a relative indicator of change in the amount of habitats of management concern.

Air Quality

None of the proposed Alternatives would create new policies or procedures related to air quality. Impacts related to air quality would result from the projected forest management activities associated with each of the Alternatives.

The Alternatives differ slightly in their effects to air quality, but none of the Alternatives has the potential for significant environmental impacts. Air pollution from dust would be mitigated by dust abatement measures under all Alternatives, and the total amount of prescribed burning would likely continue to be below the level anticipated in the Habitat Conservation Plan.



Chapter 2

Geomorphology, Soils, and Sediment

Significant increases in landslide frequency or severity and loss of soil productivity are not anticipated under any of the Alternatives. Increased soil erosion may occur in certain intensely managed areas as road use increases. Further discussion of relative impacts among the planning units and for individual watersheds is included in Cumulative Effects (Section 4.15). Alternative 6 carries the highest potential overall relative impact, followed by Alternatives 5, 3, 2, 4, and 1.

Hydrology

None of the Alternatives would be expected to increase peak flows significantly. No changes to Procedure 14-004-060 are proposed; therefore, there would be no significant adverse environmental impact.

Water Quality

The proposed different management strategies would not result in any probable significant adverse impacts. None of the Alternatives would increase the risk of water quality degradation in the long term. Existing procedures adequately protect water resources. Short-term, localized sedimentation may increase in some areas immediately following harvest, but the vegetation in the inner and the no harvest portions of the Riparian Management Zones would prevent most sediment from entering streams. Over the long term, improved riparian function would lead to improved water quality on DNR-managed westside trust lands.

Wetlands

DNR Forest Resource Plan Policy No. 21 states, “the Department will allow no overall net loss of naturally occurring wetland acreage and function.” The supporting procedure governs harvest activities in and around wetlands and is not proposed to change under the Alternatives.

The approximate delineation method, an approved approach to determine wetland boundaries, primarily uses maps and aerial photographs. However, not all wetlands, particularly forested wetlands, are visible on aerial photographs. Also, the Habitat Conservation Plan and its Environmental Impact Statement acknowledges that wetlands less than 0.25 acre may be affected by forest management activities.

The higher level of harvest in Alternatives 5 and 6 would increase the relative potential risk to wetlands, but no Alternative has the potential for significant adverse environmental impacts.



Fish

The potential for adverse effects of the proposed Alternatives to fish would not be expected to result in any probable significant impacts beyond those anticipated in the Habitat Conservation Plan environmental analysis. Over the long term, all Alternatives would be expected to result in improved riparian and aquatic conditions for fish. In part, this is the result of current degraded conditions in many areas that resulted from practices prior to adoption of the Habitat Conservation Plan.

The potential for adverse effects to fish resources from Alternatives 1 through 4 is expected to be minimal during the first decade in all planning units. In contrast, harvest activities in the riparian zone are expected to be at higher levels under Alternative 5 in the Olympic Experimental State Forest and under Alternative 6 in all planning units, largely in the form of more frequent thinning activities. In particular, the estimated levels of activity under Alternative 6, which would be 35 percent per decade, represent substantially higher levels than the other Alternatives, although the majority of the harvest area in Alternative 6 is low-volume removal harvests. It appears likely that the modeling outputs for Alternative 6 over-estimate the amount of allowable activity in the riparian areas. Additional modeling will be completed for the Final Environmental Impact Statement.

Public Utilities and Services

The Alternatives present a wide array of direct economic benefits to the beneficiaries. Potential effects on transportation infrastructure would vary by Alternative, with larger projected harvest volumes resulting in increased logging truck traffic. None of the Alternatives is expected to result in any probable significant adverse environmental impacts. These impacts are in the setting of the total forest management activity within the state of Washington and surrounding regions; current DNR harvests are about 13 percent of total western Washington harvest. Logging companies harvesting timber from forested state trust lands must meet Washington State Department of Transportation weight requirements and DNR regularly meets with local government officials and engineers to discuss the effects of logging-related traffic (DNR 1992). These measures would help mitigate potential impacts associated with increased road traffic.

Cultural Resources

While there are relative differences among the Alternatives, adverse effects on cultural resources are expected to be insignificant under all Alternatives. Forest Resource Plan Policy No. 24 requires protection of such resources and DNR is committed to consulting with Native American tribes and other interested parties about areas of cultural importance to them. These two forms of mitigation are expected to minimize risk to cultural resources.



Chapter 2

Recreation

Environmental impacts on recreation resources are assessed in relation to harvest level. More intensive harvest would have a larger impact on the landscape, potentially affecting the quality of recreation experiences in adjacent and nearby areas. None of the Alternatives is expected to result in any probable significant adverse environmental impacts. Potential effects on recreation may be mitigated on a case-by-case basis during operational planning prior to the initiation of harvest activities. Potential effects may be mitigated by employing harvest systems that minimize potential visual effects and by relocating or rerouting affected recreation facilities, particularly trails, as appropriate. All of the Alternatives would meet the minimum requirements of DNR policies and procedures that address recreation and public access (Policies No. 25 and 29).

The effects of the proposed Alternatives on fish and wildlife could, in turn, affect recreational fishing and hunting on DNR westside trust lands. Fishing and hunting opportunities on DNR westside trust lands could be positively affected to the extent that improvements in habitat and habitat suitability contribute to greater numbers of fish and game populations in some or all of the planning units. The potential effects on fish and wildlife are discussed in more detail in Sections 4.10 and 4.3, respectively.

Scenic Resources

None of the Alternatives is expected to result in any probable significant adverse environmental impacts. Lands managed for timber production under all Alternatives would be managed under DNR's visual management procedure (14-004-080), which seeks to minimize potential impacts to scenic resources by managing harvest activities with respect to sensitive viewshed areas. Potential visual effects associated with the proposed Alternatives may be mitigated on a case-by-case basis during operational planning prior to the initiation of harvest activities. Operational planning by the Department includes policies and procedures related to green-up (growing young trees for a specific time before adjacent trees may be cut), reforestation, and harvest unit size that contribute to the management of forested landscapes.

Cumulative Effects

Landscapes in western Washington are characterized by a particular distribution of forest structures. The distribution of forest structures over time and space appears to be the basis of cumulative effects in the forest environment. It is generally recognized that very large and structurally complex forests are currently scarce and medium-sized closed forests are overabundant across all ownerships in western Washington. Therefore, forest management activities that create a greater balance in forest structure at the landscape level would be expected to reduce cumulative effects.

Chapter 2



All Alternatives are modeled as resulting in increases in structurally complex forest over time. However, the rates of change and amount of change vary among the Alternatives. All Alternatives project changes in forest structure that should change the current distribution of structural classes towards more complex forests. All Alternatives create a new balance of forest structure at the landscape level. This new balance suggests that there is little potential for contributing to adverse cumulative effects.

Modeled changes in the percent distribution of forest structure classes on DNR-managed westside state trust lands are presented in Figures 2.6-2, 2.6-3, and 2.6-4. Forest structure is represented as stand development stages, which are defined in Table 4.2.14.

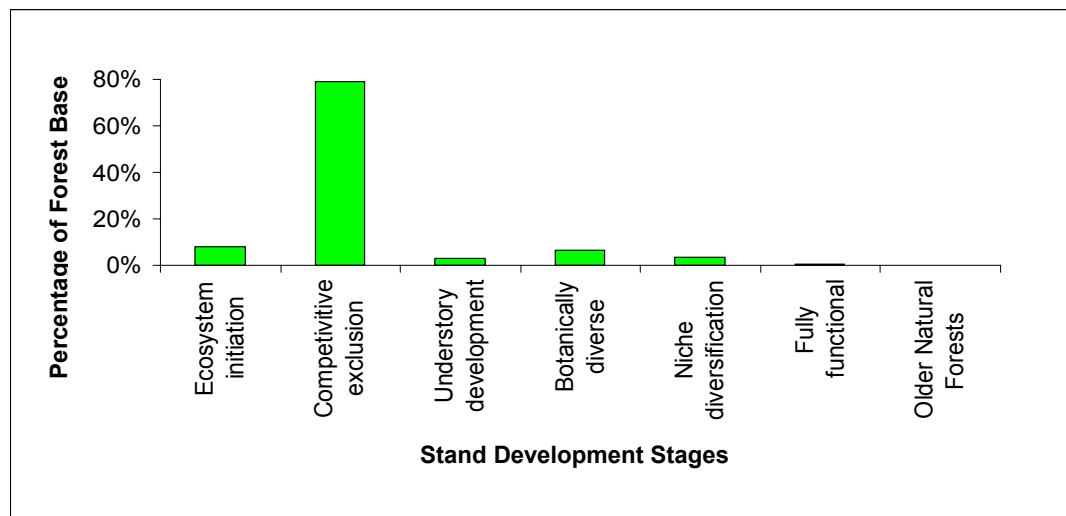


Figure 2.6-2. Modeled Proportion of State Trust Lands Forest in Each Stand Development Stage in 2004



Chapter 2

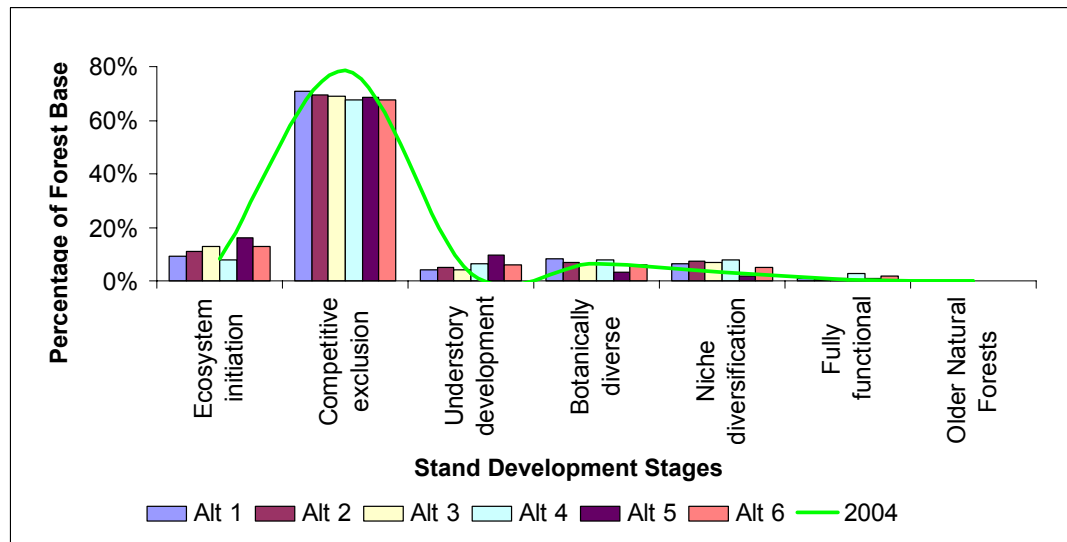


Figure 2.6-3. Modeled Proportion of State Trust Lands Forest Stand Development in Each Stage in 2013

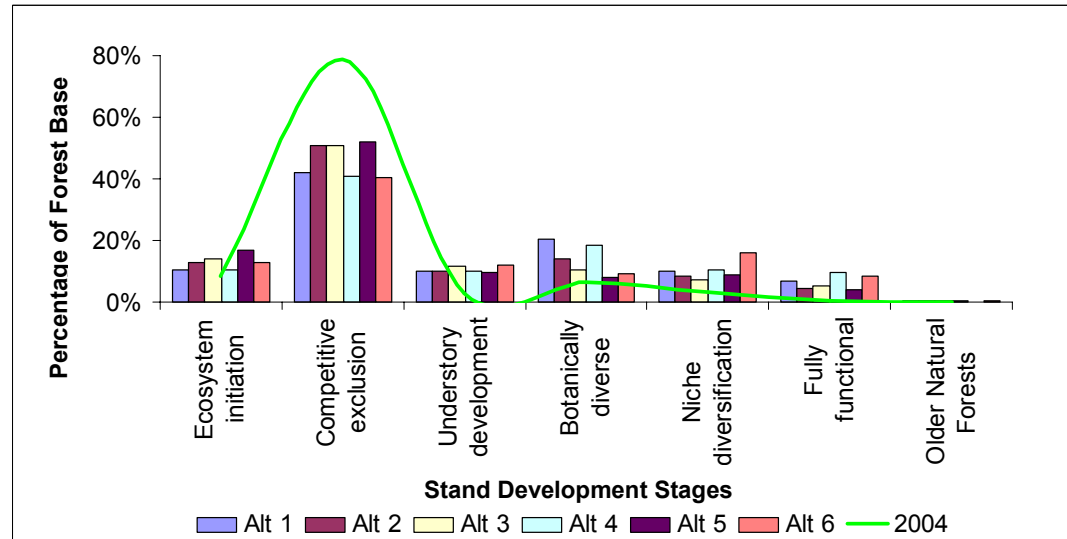


Figure 2.6-4. Modeled Proportion of State Trust Lands Forest Stand Development in Each Stage in 2067